

Assignment 4

Data collected from March 2019 is used for this assignment. The data is in the EXCEL file that accompany with this assignment. Please answer the following questions using the data listed in the EXCEL file. You are required to attach an EXCEL file showing all your calculations and figures in addition to the answers in word file.

1. Graph in EXCEL three separate bar figures with standard deviation bars showing the changes of pH, Alkalinity, and Total Hardness along the five sampling sites. Describe, with support of statistical analysis, the change of these water quality indicators along the 5 sampling sites of this creek.
2. Please plot a bar figure showing sampling sites (x-axis) vs. average nitrate concentrations (y-axis). The figures should include average concentration of each site and the associated standard deviation for the 3 replicates of each site.
 - 1) Please visually inspect the above figure for nitrate, do you think the nitrate concentrations of site 1 and site 3 are likely to be different, the same, or hard to judge? Please give your argument for your conclusion.
 - 2) Now, please conduct an Anova Single Factor test comparing the nitrate data for site 1 and site 3 using 95% confidence level ($\alpha = 0.05$) and then other one using 99% confidence level ($\alpha = 0.01$). What your conclusion would be based on the results from each Anova test? What is the take home message from this question?
 - 3) Among the 5 sites, which site has the significantly highest level of nitrate in the water? Please show your decision making process in the EXCEL.